

Applying 5S Method on Trims Store's Documentation System in an Apparel Industry*

Most. Ishat Islam

Department of Industrial Engineering & Management
Khulna University of Engineering & Technology
Khulna, Bangladesh

ishat49@gmail.com, ishat_isha@yahoo.com

Taieba Tuba Rahman

Department of Industrial Engineering & Management
Khulna University of Engineering & Technology
Khulna, Bangladesh

taieba_tuba@ymail.com

Mr. Mariam Pillege Jayantha Rajkumar

SQ Birichina Limited
Bangladesh

rajkumar.jayantha@sqgc.com , rajkumarmpj@gmail.com

Ashma Ahmed

Department of Mechanical Engineering
Bangladesh University of Engineering & Technology
Bangladesh

sorna.ahmed_14@yahoo.com

Abstract—This paper present the 5S methodology. 5S- simple but effective, lean manufacturing methodology that helps organizations to simplify, clean and sustain a productive work environment. There is a tremendous scope to implement 5S in apparel industry. This paper deals with the implementation of 5S methodology in apparel industry. 5S implementation has been carried out in trims store department, SQ Birichina Limited, Bangladesh. PDCA cycle has played an important role in the implementation of 5S. The problem has been identified during site assessment. Those problems has been solved by using 5S concept. Case study has helped to understand the before and after implementation of the scenery which has been discussed briefly. After 2(1st November to 30th January, 2014) month working there, got the expected success. The result of this project is that space utilization 27% and time saving for searching file is 82%, not only that the junior employees in that region were more confident about their task. 5S best team price giving ceremony has held on 31.12.2014 which help to make employee more interested to sustain it.

Keywords—5S; space utilization; time saving; case study; apparel industry.

I. INTRODUCTION

Nowadays in this dynamic and technological world, the secret of surviving for any kind of organization is to be competitive and pioneer in its products or services. One of the main parts of this way to succeed is continuous improvement and increasing the quality of product or service. Usually, this improvement has been achieved through implementation of best practices which are chosen to meet a particular objective. 5S is a way to improve the performance and organize the whole system [1]. 5S is a system which reduce work and optimize productivity and quality through maintaining an orderly workplace. The benefits of good workplace include the prevention of defects; prevention of accidents; and the elimination of time wasted for searching tools, documentation and other ingredients of manufacture. The 5S is the methodology of creating and maintaining well organized, clean, high effective and high quality workplace. Its result is the effective organization of the workplace, elimination of losses connected with failures and breakdowns in machines, improvement of the quality and safety of work. The implementation of 5S is crucial as it serves as stepping stones to create a strong housekeeping culture in the organization [2].

II. LITERATURE REVIEW

A good organizational methodology like 5S is an efficient lean manufacturing tool. Bayo A.M. explored the relationship between 5S use, contextual factors and performance. The contextual factors include structural features of the firm,

environment, human resources and quality management. The performance refer to improvements in productivity, quality etc. . Ho. believes that the key to productivity and quality is to carry out regular audits which constantly adapt to the changing business environment . He also demonstrates the correlation between 5S and Total quality management which further indicates the importance of 5S for a sound approach towards TQM . Moradi's findings show the effect of 5S implementation on TQM in a factory in Iran . Hamzah believes that if 5S is implemented successfully majority of the recurrent problems would be solved . Ansari presented the benefits of 5S in maintaining safety standards, a significant decrease in number of injuries were observed after the implementation of this technique [3].

5S originated from Japan and is one of foundation stone of TPM. In organizing workplace, a robust tool of housekeeping methodology of 5S is often used to reduce time wasted by looking for things, repairing the machines, changeover, and helps to decide what should be kept, where it should be kept, and how it should be stored. This method asserts it makes work easily to understand and act. 5S, standard work and TPM are the foundations for fast, flexible flow. 5S is learned from five Japanese words – Sorting, Set in order, Shine, Standardizing, and Sustaining by Hiroyuki Hirano in 1980s.(Wireman, 1990) [4].

5S- simple but effective, lean manufacturing methodology that helps organizations to simplify, clean and sustain a productive work environment.

5S-Five discipline for high workplace productivity-



Fig. 1. 5S-Five discipline

TABLE I. TERMS AND FEATURES OF 5'S

S/N	Japanese Term	Equivalent 'S' term (5S)	Equivalent 'C' term (5C)	Features
1	Seiri	Sort	Clear	<ul style="list-style-type: none"> ● Search useful and useless items ● Separate both items& Classify them ● Remove what is not needed and keep what is needed
2	Seiton	Set in order	Configure	<ul style="list-style-type: none"> ● Arrange essential item in order for easy access ● Gives color according to their use
3	Seiso	Shine	Clean	<ul style="list-style-type: none"> ● Clean and polish all working places ● Remove trash or dirt properly
4	Seiketsu	Standardize	Conformity	<ul style="list-style-type: none"> ● Establish standards and guidelines to maintain a clean workplace
5	Shitsuke	□ Sustain	Practice	<ul style="list-style-type: none"> ● Motivate employee towards work ● Makes a habit of properly maintaining correct procedures ● Generate Self discipline

III. PROBLEMS STATEMENT

- Weak file management in trim inspection rack & trim store rack.
- More time required for finding the required file
- Poor space utilization

TABLE II. 5S OBJECTIVES

<i>Reduce</i>	<i>Improve or Increase</i>
Overall Cost	Customer satisfaction
Waste	Quality
Time	Awareness And Morale of employees
Inventory or Stock	Efficiency
Industry Pollution	Safety
	Self – Discipline
	Work Environment
	Inter Human Relation or Team Work
	Productivity
	Company image

People do not need to have a high education to run 5S. Any position of the employees in the organization can certainly do it. Anyone in the company should understand and practice 5S (Skaggs, 2010). So why 5S? A lot of studies show many benefits once the company runs 5S such as creating organized workplaces (Skaggs, 2010), promoting the clean work environments (Barker, 2008), improving safety (Prabwo, N.D.), and increased product quality and productivity (Business Excellence, 2010). 5S should be considered an everyday continuous improvement activity for individuals and small groups (Breyfogle, 2008) [5].

IV. METHODOLOGY

5S methodology implementation in the trims store with the help of PDCA cycle. According to PDCA cycle, at first phase “Plan” visiting the site to find out the difficulties, time study for finding the file, prepare 5S awareness session material for different layer, design the work station, filing rack arrangement and make team. “Do” implementation of 5S and third phase “Check” time study analyzing with previous data. At last phase “Check” for continuous improvement marking and awarding system.

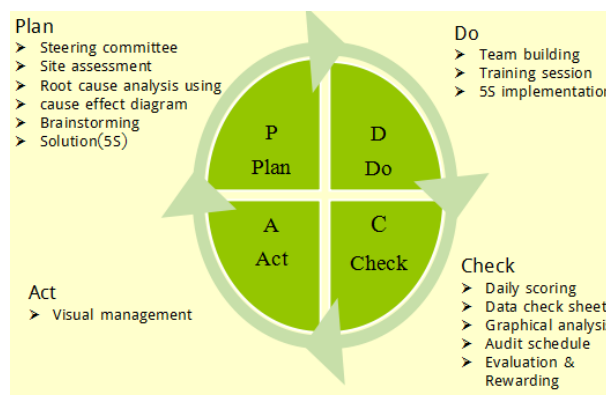


Fig. 2. Project implementation strategy

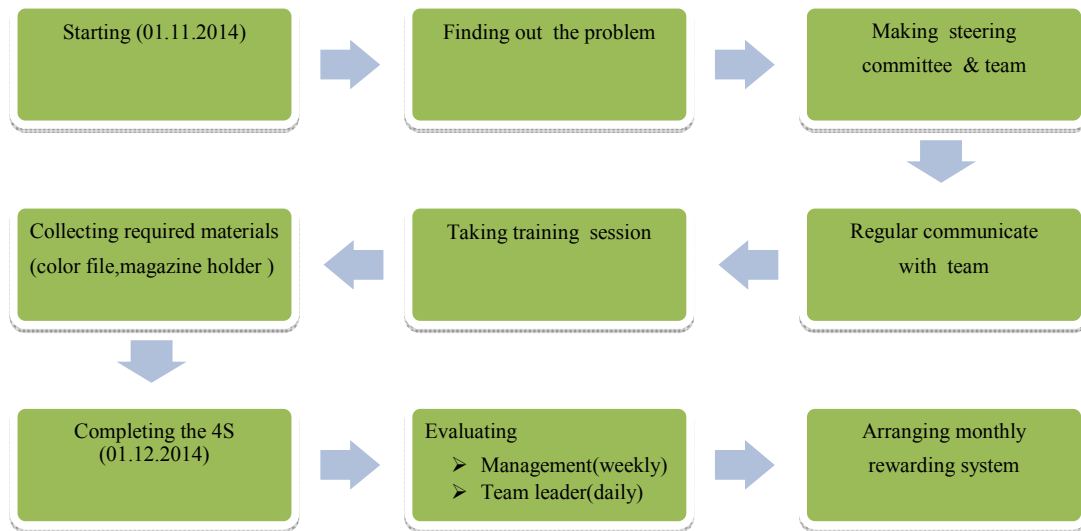







Fig. 3. Project flow chart

TABLE III. FINDINGS DURING SITE ASSESSMENT

Findings	Image	Problems
Old file was found in the rack		Required more rack space
<ul style="list-style-type: none"> ● Old file was found in the rack ● Labeling system only buyer wise ,no style wise information there 		<ul style="list-style-type: none"> ● Required more rack space ● Finding files was time consuming

<ul style="list-style-type: none"> ● Labeling system only buyer wise ● Buyer wise sequence not maintain 		<ul style="list-style-type: none"> ● Finding files was time consuming ● Probability of creating mistake
<p>Poor housekeeping in trims inspection table</p>		<ul style="list-style-type: none"> ● Poor job satisfaction ● Probability of creating mistake
<p>Poor housekeeping under the trims inspection table</p>		

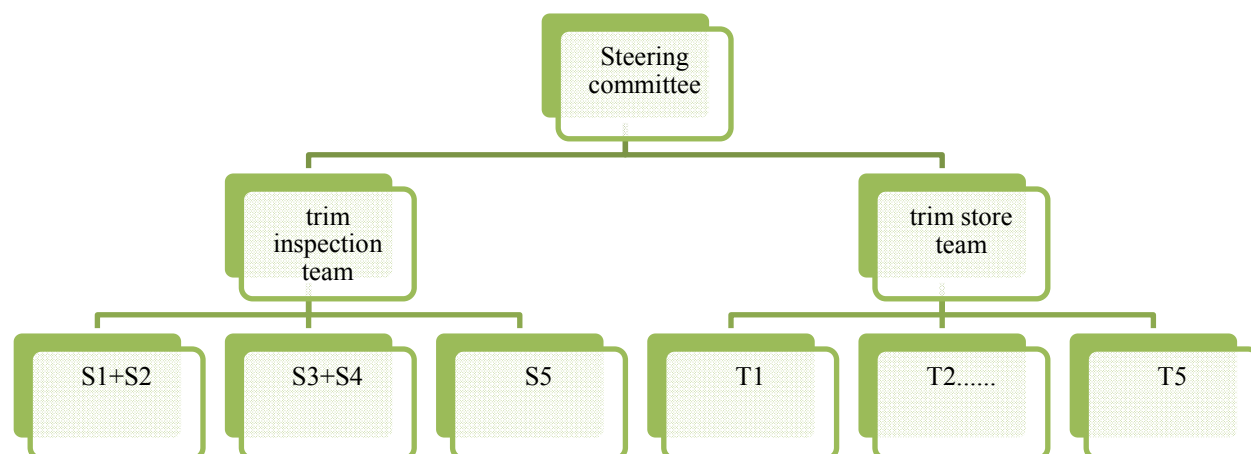


Fig. 4. Activity plan

TABLE IV. IMPLEMENTATION STEPS




Implement	Image	Advantage
Sorting: <ul style="list-style-type: none"> Old file is removed. 		Saving space
Set in order: <ul style="list-style-type: none"> Maintaining the sequence. Indexing system each holder. Standardize: <ul style="list-style-type: none"> Labeling buyer & style wise. Color code is maintained for each buyer (example: Sainsbury red color file). 		Smooth working & time saving due to quick retrieval
Shine: <ul style="list-style-type: none"> Trim inspection table is separated for each purpose. 		<ul style="list-style-type: none"> Pleasant work place. Improve job satisfaction. Healthy work environment.

TABLE V. WORKING HOUR ANALYSIS

*Average file picking rate 10/day

Activities	Time required		Working Hour Save/sheet	Monthly Working Hour Save /person
	Before Implementation	After Implementation		
Finding one sheet from rack	56 sec	10 sec	46 sec	$46 \times 10 \times 26 = 11960 \text{ sec} / 3600 = 3.3 \text{ hr}$

Employee number who maintain the file	Total working hour save/month	Time Saving %
11	$11 \times 3.3 = 36.3$	82%

TABLE VI. COST SAVING ANALYSIS FOR PARTICULAR ACTIVITIES

$Cost = time * salary / sec * 10 * working\ day$

- Average file picking rate 10/day
- Assume salary BDT 10,000 tk/month,


Activities	Cost required		Monthly Cost Minimize/Person	Employee number who maintain the file	Total cost minimize/month (taka)	Cost Saving %
	Before Implementation	After Implementation				
Finding one sheet from rack	$56 * 0.011 * 10 * 26 = 160.16tk$	$10 * 0.011 * 10 * 26 = 28.6tk$	131.56tk	11	$11 * 131.56 = 1447.16tk$	82%

TABLE VII. SPACE SAVING ANALYSIS

$Space = Case\ number * Case\ Height * Case\ Length$

File	Required space (cm)		Space saving	Saving percentage
	Previous	After implementing 5S		
Trims inspection	$4 * 18 * 33 = 2376$	$5 * 15 * 19 = 1425$	951	27%
Store <ul style="list-style-type: none"> ➤ woven file ➤ hanger carton file ➤ sewing file 	$4 * 18 * 45 = 3240$	$6 * 15 * 20 + 3 * 15 * 19 = 2655$	585	
Total	5616	4080	1536	
labeling & packing file	Upstairs in the warehouse	Now in the rack ($2 * 15 * 20 + 1 * 15 * 19 = 885$)		

TABLE VIII. COMPARING BY PICTURE(AFTER 5S IMPLEMENTATION)

	
Before	After 5S implementation
	
Now (trim inspection rack & store file rack)	

V. SUSTAINABILITY

- 5S responsibilities Team organogram
- Notice board for 5S
- Mark sheet
- Attendance sheet
- awarding system

<p style="text-align: center;">Team leader</p>  <p> Name : Abdullah Al Faroque Designation : Executive Department : Trim&Accessories Store </p>				
Team	Member name	ID No.	Designation	Picture
S1+S2	Trishna LipyAkter	31281 33732	QA	 
S3+S4	Khadiza Nobina	7649 7497	QC QA	 
S5	Asaduzzaman	30045	QA	

Fig. 5. SQBL 5S responsibilities Team (trim inspection)








<p style="text-align: center;">Team leader</p>  <p> Name : Mr. Nazrul Islam Designation : Executive Department : Accessories Store Employee Code : 8008 </p>					
Team	Area	Member name	Employee Code	Designation	Picture
T1	Woven file	Mr. Kabul Islam	8022	Store Assistant	
T2	Hanger cartoon file	Mr. Ashraf Hossen	8047	Store Assistant	
T3	Sewing file	Mr. Satter	8199	Store Assistant	
T4	Labeling file	Mr. Abdullah Al Mamun Mr. Tofayel Ahamun ad	8212 34308	Store Assistant Jr. Store Assistant	 
T5	Packing file	Mr. Mithun Ali	SQC-1050	Jr. Executive	

Fig. 6. SQBL 5S responsibilities Team (store rack)



Fig. 6. 5S notice board



Fig. 7. 5S best team and trophy

VI. RESULTS

- After implementation of 5S in the trims store department the space saving is 27% ,time saving is 82% for searching file
- Working hour saved 82% for particular activities
- Visual display management is properly used and filing handling is more easier

VII. CONCLUSION

- 5'S implementation increases the level of discipline in the trims store filing rack
- Increased job satisfaction
- Improved working accuracy
- Increased employee confidence
- Improved housekeeping

The motto of this project is :

“If we do not do 5S..... We cannot do any other work efficiently. 5S score is the indicator of how well an organization is functioning.”

ACKNOWLEDGMENT

First of all the authors would like to convey their gratitude to the Almighty Allah. Without His blessings this project would never be successful. We extend our sincere gratitude to our project member and all other colleagues who have helped us wherever and whenever we got stuck and for being patient with us even at the toughest hours. They played a very crucial role in the development of this project. We would like to express our gratitude towards the organization team for making us a part of this wonderful family. Without the guidance and help, this project would have never been completed in such a fruitful way. Special thanks to Mr. Jayantha Mariam Rajkumar, Head of Technology, whose encouragement and cooperation helped us in completion of this project. We express our gratitude to all those who have directly or indirectly helped us to make this project successful. We also wish to thank our parents who have always supported us and appreciated our work wholeheartedly and been our inspiration.

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BIOGRAPHY

Most. Ishat Islam working as QMS Executive in SQ Birichina Limited, Bangladesh. Her prime responsibilities as internal Auditor, standardize the process related flow chart & SOP, project management, process improvement, conduct training session. She has implemented 5S in documentation system, equipment design to improve the process, lean implementation in manufacturing unit (cut to box) using 6S, visual management, Kanban, JIT. Her ongoing project is ISO 9001:2015 at SQBL. She holds a BSc degree in Industrial & Production Engineering from Khulna University of Engineering & Technology, Khulna, Bangladesh. She has published her project paper “Optimization of Grinding Parameters for Minimum Surface Roughness using Taguchi Method” in ICMIEE-2014.

Taieba Tuba Rahman has worked as QMS Executive in SQ Birichina Limited, Bangladesh. Her prime responsibilities was as internal Auditor, standardize the process related flow chart & SOP, project management, process improvement, conduct training session. She has implemented 5S in documentation system, equipment design to improve the process, lean implementation in manufacturing unit (cut to box) using 6S, visual management, Kanban, JIT. She holds a BSc degree in Industrial & Production Engineering from Khulna University of Engineering & Technology, Khulna, Bangladesh.

Mr. Mariam Pillege Jayantha Rajkumar is currently a full-time Head of Technology in SQ Birichinna Limited, Bangladesh, with 20 year’s technological experience of reputed apparel industry in Sri Lanka, India, Jordan. He is certified ISO 9001:2002 auditor (Sri Lanka Standardization Institute (SLSI)), Quality Circle Developer (GIMI – Colombo), Factory Technical Audit certification (SGS-Bangladesh). His great achievement to build M&S business from zero to 2.5 Million /Month with 08 months, Factory Certified for self-inspection, deliver 1M to 6M good /Month within last 2 years. His strength on WRAP/ ISO 9000/ 6S/ AEO aerie M&S, Tesco, Matalan Certification and SLSI QA circle certification / BSTQM Kazian activities. His opinion is highly sought after and judgment is respected and trusted. His future plan helps to build co-relation with business partner (H&M, M&S, Dunnes, Next, Tesco, Debenhams, Sainbury’s, Matalan etc.). He earned National Diploma in Textile Technology from Moratuwa University. His Ultimate goal to be a global leader with humility and iron

will, become the educator and catalyst to change; ensure that correct talent begin developed / trained in the team / corporation in order to reap benefits of investment – above and beyond his presence with the corporation.

Ms. Ashma Ahmed is currently working as QMS Executive at SQ Birichina Limited. Before that, she worked as QMS Coordinator at Cosmopolitan Industries (Pvt.) Limited. She is pursuing her MSc in Mechanical Engineering in Bangladesh University of Engineering & Technology(BUET).She completed her BSc in IPE from Khulna University of Engineering & Technology(KUET).In her profession, her major responsibilities include KPI analysis, implementing 5S and 6S,conducting internal audit, developing SOPs and conducting on-job and off-job training. Besides this, she initiated blind test for workforce and implemented Kanban, JIT etc. different QMS tools. Now she is working for establishing Quality manual and standards for ISO 9001:2015. She has one conference paper published in ICMIEE 2014.Her research interests are Lean, Industrial Ecology, Quality Management system, Operations Research, boiling and condensation. She also likes blogging regarding her academic and professional topics, fashion trends, music, movies and lifestyle.